We Claim:

1. A fiber-reinforced composite ceramic, comprising:

a matrix containing at least one of SiC and Si;

a density of greater than 2.5 g/cm^3; and

an elongation at break of greater than 0.3%.

2. The fiber-reinforced composite ceramic according to claim 1, which further comprises carbon reinforcing fibers.

3. The fiber-reinforced composite ceramic according to claim 1, which further comprises a porosity of less than 5%.

4. The fiber-reinforced composite ceramic according to claim 1, which further comprises a SiC proportion of greater than 60%.

5. A method for producing fiber-reinforced composite ceramic, which comprises the following steps:

a) providing a matrix containing at least one of SiC and Si;

b) producing a blend containing carbon fibers, carbonizable bonding resin, and additional carbon material having a raw density in a range of 0.7 to 1.8 g/cm^3;

c) molding the blend into a fiber-reinforced green body;

d) carbonizing the green body to produce a C/C body; and

e) infiltrating the C/C body with a silicon melt.

6. The method according to claim 5, which further comprises initially reacting the additional carbon material with the silicon in step e), before the carbon fibers and the carbonized bonding resin.

7. The method according to claim 5, which further comprises providing the additional carbon material in the blend in step b) in a proportion of between 2 and 35% by mass.

8. The method according to claim 5, which further comprises forming the additional carbon material by pressing expanded graphite into films and subsequently pulverizing the films.

9. The method according to claim 5, which further comprises providing the additional carbon material as platelet-shaped carbonaceous particles.

10. The method according to claim 9, which further comprises providing the platelet-shaped particles with an average size of under 500 μm.

11. The method according to claim 9, which further comprises providing the platelet-shaped particles with a height/diameter ratio of greater than 50.

12. The method according to claim 8, which further comprises forming the expanded graphite by the thermal decomposing of intercalation compounds formed of graphite and at least one acid selected from the group consisting of sulfuric acid, nitric acid and perchloric acid.

13. The method according to claim 8, which further comprises providing the expanded graphite with a raw density in a range of 0.7 to 1.3 g/cm^3.

14. The method according to claim 8, which further comprises providing crushed powder of precompressed expanded graphite with a bulk density of 0.04 to 0.18 g/cm^3.

15. The method according to claim 5, which further comprises post-compressing the additional carbon material up to a

maximum density of 1.6 g/cm^3 under pressing conditions for producing the green body.

16. The method according to claim 5, which further comprises providing bundled carbon fibers with an average length of less than 80 mm.

17. A lining material for combustion chambers or furnaces, comprising a composite ceramic according to claim 1.

18. An armor protecting against ballistic effects or projectile shots, comprising a composite ceramic according to claim 1.

19. A reflective surface, comprising a composite ceramic according to claim 1.

20. A component for precision machines or calibration elements, comprising a composite ceramic according to claim 1.